

The embodiments of the invention in which an exclusive property or privilege is claimed are defined as follows:

1. In a tank having a floor, a center, and a peripheral wall, the tank containing a quantity of nonhomogeneous material including a liquid, and apparatus for mixing the nonhomogeneous material including one or more mixers for inducing flow of liquid within the tank, the improvement comprising the one or more mixers including a first mixer located a substantial distance outward from the center of the tank and a substantial distance inward from the peripheral wall of the tank, and a second mixer located a substantial distance outward from the center of the tank and a substantial distance inward from the peripheral wall of the tank, the first mixer inducing flow of the liquid in a first direction circumferentially of the tank and inward generally toward the center of the tank relative to a tangent to a circle centered about the center of the tank which circle intersects the location of the first mixer, the second mixer inducing flow of the liquid in the first direction circumferentially of the tank and outward generally toward the peripheral wall of the tank relative to a tangent to a circle centered about the center of the tank which circle intersects the location of the second mixer.

2. In the tank defined in Claim 1, the peripheral wall being circular, and each of the first and second mixers being located between 25% and 75% of the radius of the tank measured from the tank center.

3. In the tank defined in Claim 2, the first and second mixers being approximately equidistant from the center of the tank.

4. In the tank defined in Claim 1, the first and second mixers being approximately aligned vertically in the tank.

5. In the tank defined in Claim 1, the first mixer being angled inward at an angle between 45 degrees and 60 degrees, and the second mixer being angled outward at an angle between 10 degrees and 30 degrees.

6. In the tank defined in Claim 1, each of the first and second mixers being positioned closer to the center of the tank than to the peripheral wall of the tank.

7. In the tank defined in Claim 1, the first and second mixers inducing approximately equal flows.

8. In the tank defined in Claim 1, the liquid having a median depth, and each of the first and second mixers being located below the median depth of liquid.

9. In the tank defined in Claim 1, the first mixer being substantially closer to the floor than the second mixer.

10. In the tank defined in Claim 1, each of the first and second mixers including a jet nozzle.

11. In a tank having a floor, a center, and a peripheral wall, the tank containing a quantity of nonhomogeneous material including a liquid having a median depth in the tank, and apparatus for mixing the nonhomogeneous material including one or more submerged mixers for inducing flow of liquid within the tank, the improvement comprising the mixers including a plurality of first mixers located a substantial distance outward from the center of the tank and a substantial distance inward from the peripheral wall of the tank, the first mixers being equidistant from the center of the tank, and a plurality of second mixers located a substantial distance outward from the center of the tank and a substantial distance inward from the peripheral wall of the tank, the second mixers being equidistant from the center of the tank, each of the first mixers inducing flow of liquid in a first direction circumferentially of the tank and inward generally toward the center of the tank relative to a tangent to a circle centered about the center of the tank which circle intersects the locations of the first mixers, each of the second mixers inducing flow of the liquid in the first direction circumferentially of the tank and outward generally toward the peripheral wall of the tank relative to a tangent to a circle centered about the center of the tank which circle intersects the locations of the second mixers.

12. In the tank defined in Claim 11, the first mixers being spaced uniformly circumferentially of the tank, and the second mixers being spaced uniformly circumferentially of the tank.

13. In the tank defined in Claim 11, the peripheral wall being circular and each of the first and second mixers being located between 25% and 75% of the radius of the tank measured from the tank center.

14. In the tank defined in Claim 11, the first and second mixers being approximately equidistant from the center of the tank.

15. In the tank defined in Claim 11, each first mixer being approximately aligned vertically in the tank with one of the second mixers.

16. In the tank defined in Claim 11, each first mixer being angled inward at an angle between 45 degrees and 60 degrees, and each second mixer being angled outward at an angle between 10 degrees and 30 degrees.

17. In the tank defined in Claim 11, each of the first and second mixers being positioned closer to the center of the tank than to the peripheral wall of the tank.

18. In the tank defined in Claim 11, the first and second mixers inducing approximately equal flows.

19. In the tank defined in Claim 11, each of the first and second mixers being located below the median depth of liquid.

20. In the tank defined in Claim 11, each first mixer being adjacent to the floor, and each second mixer being raised above the floor at an elevation higher than the first mixers.

21. In the tank defined in Claim 11, each of the first and second mixers including a jet nozzle.

22. In a tank having a floor, a center, and a circular peripheral wall, the tank containing a quantity of nonhomogeneous material including a liquid having a

median depth in the tank, and apparatus for mixing the nonhomogeneous material including one or more submerged mixers for inducing flow of liquid within the tank, the improvement comprising the mixers including a plurality of first jet nozzles located a substantial distance outward from the center of the tank and a substantial distance inward from the peripheral wall of the tank, and a plurality of second jet nozzles located a substantial distance outward from the center of the tank and a substantial distance inward from the peripheral wall of the tank, the first and second nozzles being equidistant from the center of the tank at a location closer to the center than to the peripheral wall and no closer to the tank center than at least 25% of the radius of the tank, each first nozzle being aligned vertically with one of the second nozzles and the first and second nozzles being spaced uniformly circumferentially of the tank, each of the first nozzles inducing flow of liquid a first direction circumferentially of the tank and inward generally toward the center of the tank at an angle of 45° to 60° relative to a tangent to a circle centered about the center of the tank which circle intersects the locations of the first nozzles, each of the second nozzles inducing flow of liquid in the first direction circumferentially of the tank and outward generally toward the peripheral wall of the tank at an angle of 10° to 45° relative to a tangent to a circle centered about the center of the tank which circle intersects the locations of the second nozzles, the inward directed angle of the first nozzles being greater than the outward directed angle of the second nozzles, and the first and second nozzles inducing approximately equal flows.

23. The method of mixing material in a tank having a floor, a center, and a peripheral wall, the tank containing a quantity of liquid having a median depth, which method comprises:

inducing a first flow of liquid in the tank at a location adjacent to the tank floor, a substantial distance outward from the center and a substantial distance inward from the peripheral wall, in a first direction circumferentially of the tank and partly inward toward the center; and

inducing a second flow of liquid in the tank at a location substantially higher than the first flow, a substantial distance outward from the center at a substantial distance inward from the peripheral wall, in the first direction circumferentially of the tank and partly outward toward the peripheral wall.

24. The method of Claim 23, including inducing the first flow with a first jet nozzle, and inducing the second flow with a second jet nozzle.

25. The method of Claim 23, in which the first nozzle and the second nozzle are aligned vertically.

26. The method of Claim 23, including inducing a plurality of first flows by a plurality of first jet nozzles spaced uniformly circumferentially of the tank, each of the first nozzles being at a location adjacent to the tank floor, no closer to the center of the tank than 25% of a radius, and each first nozzle being directed so as to eject liquid in the first direction circumferentially of the tank and partly inward toward the center, and further including inducing a plurality of second flows by a plurality of second jet nozzles spaced uniformly circumferentially of the tank, each of the second nozzles being at a location above the tank floor at an elevation higher than the first nozzles, no closer to the center of the tank than 25% of a radius, and each second nozzle being directed so as to eject liquid in the first direction circumferentially of the tank and partly outward toward the peripheral wall.